

The Earth as Seen from Space

Don Hillger and Gary Toth.

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Hurricane Gilbert is nicely depicted on a stamp from Belize (Scott 974, Michel 1073) issued in 1991. The image is a false-color composite showing everything from the eye of the hurricane to the spiral arms and high-level white cirrus clouds that flow out of the top of such storms. Although an image at this spatial resolution or quality is possible from geostationary orbit, highly-detailed images are generally obtained from satellites orbiting at an altitude of about 1000 km or less. The source of this image is not identified in the stamp. Note the country outlines on the image, often applied to satellite images to help users geolocate the clouds, which is particularly useful when land features are obscured.



Belize (Scott 974, Michel 1073) from 1991.

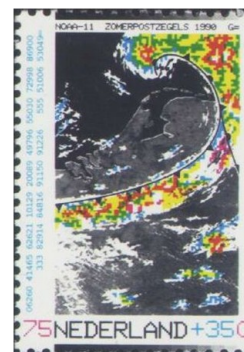
Another example of a high resolution image from lower orbit is found on a personalized label from a sheet of 10 stamps and 10 labels issued in 2004 by Taiwan (Scott 3574k). All of the labels contain images from satellites. This stamp is from one of three such sheets promoting the various services of the Central Weather Bureau: meteorology, seismology and astronomy. The stamp shows a portion of mainland China mostly clear of clouds under a high pressure area. In this case, the cold air has moved southeastward over the ocean in a cold outbreak. Extensive low-based stratocumulus and cumulus-type clouds have formed over the water, which is much warmer and more humid than the land.



One of 10 labels from Taiwan (Scott 3574k) from 2004.

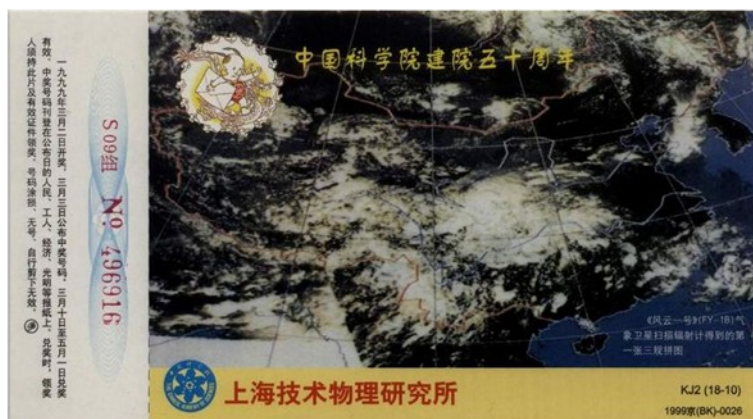
Images on postal items are sometimes attributed to specific satellites. One such item is a postal card from the People's Republic of China issued in 1999. Even though the text is in Chinese, the image can be identified as from the FY-1B polar-orbiting weather satellite, one of the Chinese Feng Yun (wind-cloud) polar-orbiting satellite series.

Netherlands issued a stamp (Scott B652, Michel 1381) in 1990 that the text on the stamp credits to NOAA-11, one of the long series of US National Oceanic and Atmospheric Administration polar-orbiting weather satellites that have been around since 1970. The image shows the clouds associated with a frontal system over the Netherlands. Color coding is used to emphasize the temperatures of the cloud tops. Cold and warm fronts are overlaid on the image, corresponding to the comma-shaped cloud seen in the satellite image. Note the clearing behind the cold front.



Netherlands (Scott B652, Michel 1381) from 1990.

In 1989 the United Nations issued pairs of stamps with satellite images from each of its offices. The New York stamps (Scott 550-551, Michel 575-576) are shown in this article, but similar stamps from Geneva (Scott 176-177, Michel 176-177) and Vienna (Scott 91-92, Michel 92-93) can be found in the authors' website (a link is provided at the end of this article). Each set of stamps contains color-enhanced images. These false-color images are usually created from data obtained in different spectral bands and then combined in particular ways. This technique has several advantages, including helping users to distinguish between land and cloud features. Such differences are clearly illustrated in the 25c value stamp. The other stamp shows a typhoon over the Pacific; no land features are seen, but some latitude/longitude lines have been added to the image to facilitate the location of the various cloud features.



China PR postal card from 1999.



United Nations (New York) (Scott 550-551, Michel 575-576) from 1989.

The number of images on postal items with geographic and clouds features is extensive. Therefore, only some of the better examples have been shown in previous sections. Next to be discussed are high-resolution images of the Earth's surface. Such images are most useful in cloud-free areas, since of course clouds block the surface features of interest.

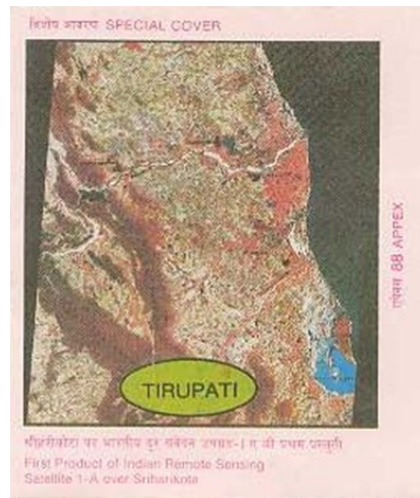
High-resolution images of Earth's surface.

There are numerous images which show the Earth's surface, generally with no or few clouds. Many of these images are much more detailed than the previously-featured images, since they are obtained at higher spatial resolution. Such images are created by satellites generally in orbits even lower than those of polar-orbiting weather satellites.

Good examples of high-resolution images from the French SPOT (Satellite Probatoire de l'Observation de la Terre) satellite are found on French Polynesia stamps (Scott 587-589, Michel 605-607) from 1992, one of which is shown here. Usually such images are color-enhanced to look brighter than they would normally be as true color images, and to emphasize the surface features, such as vegetated surfaces vs. bare ground.



French Polynesia (Scott 587, Michel 605) from 1992.



Indian cover from 1985 with a cachet image from IRS-1A.

Similar high-resolution and color-enhanced images are available from the Indian Remote Sensing Satellite (IRS), as found in the cachet of a cover from India from 1985. The satellite itself is shown in the cancel on this cover. Tirupati is a town in eastern India. Different colors in the image show different terrain and/or vegetation. For example, the dark brown zones are areas of somewhat higher terrain. The blue area at the lower right is Pulicat Lake, a relatively shallow body of brackish water. Reddish tones north of the lake may be related to certain types of coastal vegetation, such as mangrove forests. The black to the right is the waters of the Bay of Bengal.

Finally, the US Landsat (Land Satellite) series has been gathering Earth-surface images for over 40 years. Three Landsat images were featured on the back of a US aerogramme (Scott UC58) from 1985. The front (not shown here)



features the Landsat-4 or 5 satellite. From left to right, the images are of the cities of San Francisco, Washington and New York.

The United States issued a beautiful sheet of 15 (Scott 4710, Michel 4883-4897) stamps in 2012 with the general theme of "Earthscapes". Three of the stamps contain high resolution satellite images. Two (Scott 4710b and 4710h, Michel 4884 and 4890) are from Landsat-7. The first one shows Mount St. Helen's in Washington State, and the second stamp features fields around Garden City, Kansas, with their center-pivot irrigation systems.



United States (Scott 4710b, Michel 4884).

Such images can be useful for resource and crop monitoring. The first Earth resources satellites came into being as part of government programs, but re-



Back of United States aerogramme (Scott UC58) from 1985.

(contd. from p3, *Earth from Space.*)



United States (Scott 4710h, Michel 4890) from 2012.

cently their capabilities have been commercialized by companies which have launched their own satellites. They then sell their specialized imagery to both government and private users. One example of an image from such a satellite is (Scott 4710a, Michel 4883) from the same US Earthscapes sheet already mentioned.

This image, from a privately-owned satellite (either GeoEye or Ikonos), shows Alaska's Bear Glacier and chunks of it that have broken off and are floating in the water.



United States (Scott 4710a, Michel 4883) from 2012.

Conclusion

Earth imaging from space has come a long way since its beginnings over 50 years ago. A few crude images of landforms and cloud systems with limited usefulness have, through continued scientific and technological development, become high resolution specialized images of any location on the globe, with multiple applications.

This survey of imaging capabilities gives only a limited number of examples of the many types and spatial resolutions of Earth surface imagery that can be found. Only a few of the best available images have been included in this arti-

cle. Readers are urged to check the authors' website (noted below) for additional postal items. ■

Additional online information.

A checklist of postal items showing the Earth as seen from space is available at <http://rammb.cira.colostate.edu/dev/hillger/satellite-images.htm>.

The authors have researched and written extensively on the subjects of weather, climate, and un-manned satellites on stamps and covers. See <http://rammb.cira.colostate.edu/dev/hillger/stamp-articles.htm>

Biographical notes

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(contd. from p1, *Chamizal.*)

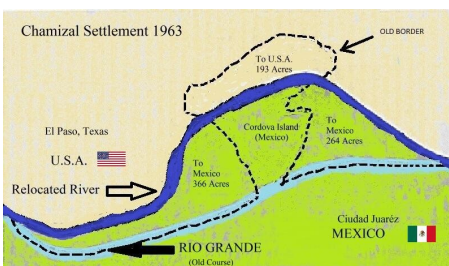


Fig. 4 - El Chamizal.

The territory was given the name "El Chamizal", a part of El Paso. Both Mexico and the U.S. claimed it. Many American citizens lived in the area.



Fig. 5 The Chamizal today.



Fig. 6 Mexico Mi 1168.

In 1910 Mexico and the US agreed that an arbitration tribunal would examine this issue. The Commission came up with a kind of "Solomon" judgment. It was determined that all the land formed on the right bank of the river came under dominion and jurisdiction of Mexico and land formed on the left bank of the river under U.S. jurisdiction. This was rejected by the US. Between 1911 and 1963 several attempts were made to solve the problem.

The conflict continued to have negative affects on the relations between Mexico and the US, until

1963 when President J.F. Kennedy agreed with the recommendations of the Arbitration Committee from 1911. He hoped this would strengthen the "Alliance of Progress" and solidify the "Organisation of American States" (OAS).

In August 1963, the "Chamizal Treaty" was signed. This included, among other things, that the Mexicans retained 437 acres/ca 1.8 km² and the US 193 acres/0.8 km² of the area concerned.

There was a scheme to compensate for the resettlement of the 3,700 US citizens in the area. Another aim of the agreement was the relocation of the river by construction of a channel to remove ambiguities about the border in the future. Both countries shared the costs of the construction. See *maps of Chamizal Settlement and El Paso and the seal of Mexico (Mi 1168)* with the handshake between US-president Kennedy and Mexico-president Mateos. ■